

The **American Fertilizer**

Vol. 96

JANUARY 31, 1942

No. 3



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NITRATE of SODA

•
SULPHATE of AMMONIA

•
ORGANIC AMMONIATES

•
SULPHUR
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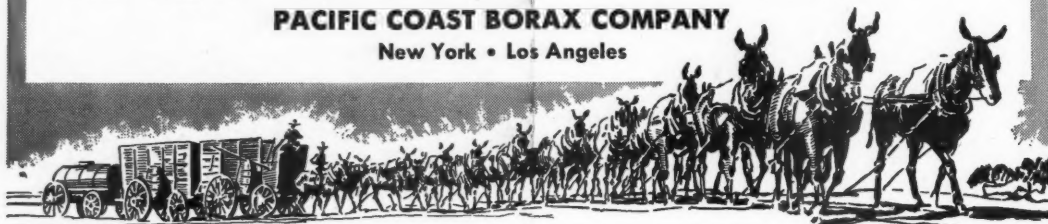
NOT all soils are acutely deficient in boron, that element in borax essential to plant growth. In fact, in the larger and more important number of cases, crops may not show definite symptoms of boron deficiency, yet benefit distinctly from applications of borax, both quality and quantity being improved. Since, under field conditions, it is often difficult to predetermine whether sufficient boron will be available during a growing season, agricultural experts now recommend that borax be applied annually to field and truck

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See Page 25

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

...THE...

AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

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No. 3

Some Newer Ideas on Orchard Fertility*

By F. N. FAGAN

Pennsylvania State College, State College, Pennsylvania

AS I sit here thinking over the subject of orchard fertility that Senator Byrd asked me to discuss with his friends this year, my thoughts turn to the several times I have been a guest at the Byrd picnic. Just what is it that brings orchard folks to this picnic year after year? Many guests have driven miles to be here. The thing which brings us is something big, at least I think it is. It is not just for the good dinner Senator Byrd gives us. Most of you could have bought a good meal right at home for the price of the gasoline you used to drive to this orchard. Some people may think it is the apple buyer contacts made here. Some people may say it is politics. I for one will say that I never felt it was politics, but we orchard folks as well as all farm folks can thank our lucky stars that we have Harry F. Byrd, the orchardist, in the U. S. Congress. I wish we had some more of you in Congress.

I truly believe that what brings orchard folks here from the four corners of Virginia, from West Virginia, Maryland, Delaware, Pennsylvania, and even from more distant states, is the enthusiasm, the interest, yes, the love for a real industry, the fruit industry, an industry that has weathered storms of insects, diseases, and hail; an industry that has in the main fought its own battles; an industry that has had its ups and downs, but is still an industry furnishing a living for thousands of people.

The farm and orchard folks east of the Allegheny Mountains can be proud of their industry, for most of their farms are a better

place to live today than they were 50 or 75 years, yes, 100 years ago, and many of their acres are producing food in larger amounts than they did 75 years ago. I am glad I am connected with such an industry.

Let me say right now that I feel highly honored to have been asked by Orchardist Harry Byrd to be a speaker at his picnic. I feel high honored to have him ask me to discuss the fertility problem, for after all, the fertility of the soil is the all-important part of any branch of a successful agriculture.

The food in the soil for the plant or tree is the main key to all crop problems. We may trim our trees and spray them against pests, but if the soil does not contain the right food and in large enough amounts, and is not able to hold moisture, all such work is likely to be lost. We must have enough of the elements of plant food, which by the way includes moisture, in the soil or we can not expect our trees to produce yields of fruit large enough to leave a profit for our labor at harvest time. A high yield of 900 packed bushels of apples per acre has about the same acre production cost as a low yield of 200 packed bushels per acre. A 600- to 900-bushel yield can not be had without plenty of plant food and moisture in the soil.

Yes, I know some of you are thinking "plant food," be it chemical fertilizer or manure, costs too much money. I wish to drive home to you orchard and farm folks that we should hand out a word of praise, right now, to the fertilizer, chemical, and lime industries. They are giving us cheaper fertilizers, spray chemicals, and lime products than ever before, and all of these help to cut our cost of production. Yes, these industries need a word of praise for, in most cases, they are trying to sell us

* Reprinted from "Better Crops with Plant Food," December, 1941 issue. An address delivered at the picnic given by Senator Harry F. Byrd at his Rosemont Orchard near Berryville, Virginia, on August 30, 1941. Senator Byrd is one of Virginia's largest orchard operators and for many years has invited more than 1,000 people interested in the production of more and better fruit to be his guests, partake of a delicious dinner, and listen to good speeches and discussions on orchard problems.

the right materials instead of just tonnage. They know the orchard man and farmer must be successful or he will not be a customer year after year.

The fact that we have farm acres that have been under the plow and producing paying crops for 50, 75, and 100 years shows clearly that the U. S. farmer knows his industry, his soil, his Old Mother Nature. Sure we have farmers that get into financial trouble. If I remember correctly, a lot of banks, manufacturing plants, and retail stores also had their financial troubles during the last 12 or 14 years, and just as high a percentage as in the farming game.

Yes, the U. S. farmer knows his industry, knows a lot about his soil fertility and crop production. No group of people know their business better than the farmer knows his business. The past 16 years of American agriculture proves this fact.

Government Farm Legislation

Many years ago by Government legislation to help agriculture, a noble experiment, the Farm Board Bill was enacted, and since that time many other noble legislative bills have been enacted to help agriculture. If I am not mistaken, there was nothing really more wrong with agriculture when the Farm Board Bill was enacted than there were things wrong with a lot of other industries. If I remember correctly, one Virginia Senator, Mr. Carter Glass, said then that the act would not help agriculture, but that it might keep some tobacco, cotton, and grain banks, that had been doing a poor job of banking by loaning too much money on warehouse receipts, from failing. If I remember correctly, Mr. Glass never liked the change that was made in the National Bank Law some years ago. During the last 16 years there has been a lot of world "underconsumption" of food and not world "overproduction" of food.

The noble experiments to control agricultural production (tobacco, cotton, wheat, etc.) by reducing acreage and paying the farmer to do so have not reduced production. We still hear a lot of talk about surpluses, even to the tune of a 49 cent tax on a bushel of wheat if Mr. Farmer has produced more than his ratio, whether he has or has not signed on the dotted line. He'll just grow rye, barley, or oats next year. He knows his livestock will eat chops made from grain other than wheat; he knows his livestock will bed down on good straw even if it is not wheat straw; he knows rye, barley, and oat straw, through the barn and feed lot, will make just as good manure.

The same farmer will be buying at the same time his share and maybe more than his share of Defense Savings Stamps and Bonds, and if war comes, we can depend on him to do his part as he did in World War I.

The independent land-owning or good U. S. tenant farmer knows just too much about his soil's producing power for "The Economic Planners" to cope with. He may be a gambler, but if he is, I am sure he knows his cards. Beat him at his game if you can.

All Plant Foods Needed

Few of you need to be told anything about feeding your trees their nitrogen food, such as from nitrate of soda, cyanamid, sulphate of ammonia, etc. Some of you do not use enough, however. How many of you have been thinking about the following foods for your orchards: phosphate, potash, calcium (lime)? About the organic and water-holding power of your orchard soils? I am sure not enough thought has been given by you, as well as by experiment station workers, to these items of fertility. How many of you would grow wheat without at least the use of phosphate fertilizer or a complete fertilizer such as a 2-12-4, a 2-8-8, or a 4-12-4? Not many of you. How many of you would grow a crop of corn without some fertilizer? Many of you would use some phosphate even if the corn was being planted on land where you had plowed down a clover, alfalfa, or hay land sod to which you had applied that fine fertilizer—manure. Yes, we orchard folks have neglected using phosphate, potash, lime, manure, and cover crops.

It seems funny to me now why we thought we could get along without them. We knew we needed them for farm crops, and trees grow just the same as cotton, corn, tobacco, wheat, and the truck crops. The truck gardener has always been a great user of manure and other fertilizers as well as nitrogen, and we can learn a lot from him if we will. We orchard folks used to practice the fine, clean cultivation system in our orchards. By this method, we unlocked all the natural nitrogen in the soil. The trees grew fast during their young years, then they did not do so well. We then fed nitrogen, in soda and sulphate of ammonia. The trees responded and we were satisfied, but this clean cultivation year after year at last caused all the natural organic material to burn out of the soil. Our good little friends, the soil bacteria, died because we had destroyed their homes. They could not work for us, could not even help with the phosphate and

potash liberation. Legumes would not grow, and nitrogen bacteria could not put nitrogen back into the soil.

I know but one thing about soil bacteria, and that is, they are the orchard man's friends. With clean cultivation year after year we did all in our power to keep nature from working for us. We applied nitrogen fertilizer, used it up, and never figured we were also losing our phosphate, potash, and calcium by this method of orchard soil culture. Surface wash took its toll of these plant foods. We cannot have soil bacteria working for us in a clay bank. Good bricks could have been made from the soil in many an orchard by sifting out the stone and burning the clay in the normal brick-making way. We wanted to grow a big tree fast—cultivation would do it.

The fruit tree nurseryman could have told us what we would do to our soil. He was a clean culture man to the Nth degree. In many cases of tree growing he cultivated his land clean for three summers before he dug his trees, but he never put trees right back on the same land. He put his land back to a rotation of farm crops with manure or back to sods of grasses, clovers, or some other legumes. The orchard fertilizer problem is interlaced with the general system of orchard soil management, be it cultivation given or not given, cover crops grown or not grown, stock manure used or not used, sods grown or not grown. Let me read to you a few statements about orchard fertility. These statements come from several different sources and point to the use of complete fertilizers.

Annual Fertilization Beneficial

Turning to recent published work on orchard fertilization we find Professors Blake, Nightingale, and Davidson stating in New Jersey Agricultural Experiment Station Bulletin 626 as follows:

"Some orchard soils may be so well supplied with all the common nutrients that they will not show a beneficial response to applications of fertilizers. Other soils may be deficient in one or two nutrients but be well supplied with the remaining elements. In general, however, orchards planted upon Coastal Plain soils will be benefited by annual applications of a complete fertilizer.

"Orchard soils which are obviously deficient in nutrients and where neither sod, cover crops, weeds, nor trees are making enough growth should receive a complete fertilizer somewhat higher in nitrogen, such as 5-10-5 . . . If the trees and soil are not actually deficient in nutrients, this treatment is definitely unwise.

"Calcium should be regarded as a fertilizer material, rather than a soil corrective."

In *Better Crops With Plant Food*, May, 1937, F. W. Hofmann of the Virginia Agricultural Experiment Station states, "If the orchard soil is not strong enough to maintain a good crop of grass or sod, it should receive 600 to 800 pounds of an 8-6-6, 6-8-6, or 10-6-4 fertilizer. If the soil is capable of producing a lush growth of grass or sod, the fertilizer application may be more confined nearer the area under the spread of the tree and to fertilizers with the higher nitrogen content."

In *Better Crops With Plant Food*, August-September, 1936, E. H. Rawl of Clemson College, South Carolina, recommends the use of a complete NPK fertilizer in the peach orchard plus the use of dolomitic limestone. In the South Carolina peach tests not only foliage and tree growth but size of fruit was greatly improved by the use of complete fertilizer plus the limestone. It is interesting to note that where such fertilization was given good stands of cowpea cover resulted under the spread of peach tree branches.

From Pennsylvania State College Agricultural Experiment Station Bulletin 294: "The fertility of an orchard soil is more than its plant-food content. It involves the nature of the soil, its depth and topography, its previous treatment, the use of fertilizers and manures, the amount and nature of the cultivation, and the cover or sods grown. Fertilizers are only part of the problem of soil fertility.

"In this orchard any treatment that has influenced the trees at all has done so in the following order: first, the cover crops; perhaps several years later, leaf color; shortly after, branch growth and circumference increase; and last of all yield.

"The reason for this sequence of results is that the treatments—whether chemical fertilizers, manure, or cover crops—have influenced yields chiefly by changing the organic matter content of the soil; that is, those treatments which have resulted in the production of larger cover crops have ultimately resulted in the production of more fruit.

"A short, non-legume sod rotation is an efficient means of building up a depleted orchard soil. After a sod of any kind becomes thick, tree growth is checked and yields decline. Orchard sods should be turned under, or partially broken, frequently.

"Trees receiving annual tillage with July seeding of cover crops have not done so well as those under sod rotations. If the cover

(Continued on page 22)

Deliveries of Potash Salts During 1941

The American Potash Institute, Inc., announces that deliveries of agricultural potash by the four major producing Companies within the continental United States, Canada, Cuba, Puerto Rico, and Hawaii during the fourth quarter of the calendar year 1941 amounted to 154,026 tons of actual K_2O , equivalent to 286,677 tons of potash salts. Constituting this total were 209,296 tons of muriate, 42,211 tons of manure salts, and 31,170 tons of sulphate. In addition, deliveries for chemical uses amounted to 25,090 tons of salts, equivalent to 15,556 tons of K_2O . These figures include salts of domestic origin only.

For the calendar year 1941, deliveries of agricultural K_2O amounted to 460,316 tons, equivalent to 849,745 tons of potash salts, consisting of 654,557 tons muriate; 117,204

tons manure salts; and 77,984 tons sulphate. Regional distribution on a K_2O basis was as follows: Northeastern and Mid-Atlantic States, 88,951 tons; Southern States (Virginia included), 226,537 tons; Midwestern States, 86,184 tons; West Coast States, 8,815 tons; the remainder, 49,829 tons K_2O was delivered to Canada, Cuba, Puerto Rico and Hawaii. In addition, deliveries for chemical uses amounted to 83,809 tons of salts, equivalent to 51,962 tons of K_2O .

As a basis of comparison, deliveries of agricultural K_2O , from both domestic and foreign sources, during 1940 amounted to 444,078 tons of actual K_2O , equivalent to 797,222 tons of potash salts. Constituting this latter total were 673,483 tons of muriate, 18,077 tons of manure salts, 67,453 tons of sulphate, 3,532 tons of sulphate of potash-magnesia, and 34,677 tons of kainit. In addition, deliveries for chemical uses amounted to 61,335 tons of salts containing 38,028 tons of K_2O .

Potash Deliveries

(United States, Canada, Cuba, Hawaii, Puerto Rico)

	Calendar Year 1941	Short Tons K_2O		
		Calendar Year 1940	Oct.-Dec., 1941	Oct.-Dec., 1940
Muriate, 60 + 50%	393,525	326,284	126,845	119,595
Manure Salts, 30 + 25%	32,561	4,566	12,803	2,389
Sulphate + Sul. Pot. Mag.	34,230	21,169	14,378	9,620
Total Agricultural	460,316	352,019	154,026	131,604
Chemical Potash	51,962	38,028	15,556	9,986
Grand Total	512,278	390,047	169,582	141,590
Northeast-Middle Atlantic States	88,951	73,321	24,731	29,287
Southern (including Va.)	226,537	157,128	84,518	59,958
Mid-Western	86,184	66,908	25,576	25,861
West Coast	8,815	6,894	3,680	2,443
Canada, Puerto Rico, Cuba, Hawaii	49,829	47,768	15,521	14,055
Total Agricultural	460,316	352,019	154,026	131,604

Deliveries of Potash Salts of American Origin for the Calendar Year 1941—Summary

Institute Territories (Agr.)	In Tons of 2,000 lb. K_2O				Sulphate*	Total
	60%	50%	30%	25%		
South	151,406.00	33,012.86	1,024.04	21,175.07	19,918.93	226,536.90
Northeast	76,583.13	6,584.35	47.39	727.90	5,008.59	88,951.36
Mid-West	75,767.38	3,798.92	.....	5,652.15	966.06	86,184.51
West	4,140.37	619.80	.....	.....	4,054.60	8,814.77
Total U. S.	307,896.88	44,015.93	1,071.43	27,555.12	29,948.18	410,487.54
Canada	15,521.65	986.08	.....	3,856.02	1,370.15	21,733.90
Cuba	2,234.31	.....	.....	78.40	329.66	2,642.37
Puerto Rico	12,873.55	.....	.....	.....	1,594.58	14,468.13
Hawaii	9,996.34	.....	.....	.....	988.00	10,984.34
Total Institute Territories	348,522.73	45,002.01	1,071.43	31,489.54	34,230.57	460,316.28
Total Chemical	51,961.80	.....	.....	.....	.....	51,961.80
Total Chemical and Agr.	400,484.53	45,002.01	1,071.43	31,489.54	34,230.57	512,278.08

* Includes Sulphate and Sul. Pot. Mag.

We Have What It Takes*

By CLAUDE R. WICKARD

Secretary of Agriculture

IT is seven weeks since Pearl Harbor!

The blood and sweat and tears we heard about from other lands are now being shed by our own American fighting men on a battle front that stretches around the globe.

Many people are saying that the bombs that fell on Pearl Harbor that black December seventh blasted us out of our slumber.

It was time we woke up. For over two years, the world had been collapsing around us, collapsing with such a roar that it seemed the very dead would be aroused from their sleep. But we Americans do not wake very easily. This is a weakness we share with the other democracies of the earth, some of them now suffering under the iron heel of Hitler's legions.

Some far-seeing leaders tried their best to rouse us. Franklin Delano Roosevelt did all he could. He told us what would happen. He warned us time and time again. Some called him a war-monger. Others thought he was unduly excited about a foreign war. But time has proved him right. Today his leadership is an inspiration to liberty-loving men over the world. That leadership is one of the reasons why we can win complete and total victory.

But in spite of the President's warnings, a treacherous enemy caught us off guard. That was our own fault. For years the Axis powers had armed to the teeth before our very eyes. They made no secret of their plans to conquer and rule the world.

At this hour they are furiously engaged in their work of destruction. They will be stopped only if and when we rouse ourselves to the fullest pitch of our power.

Slogans will not stop them. Bragging will not stop them. Surveying our vast resources of material and manpower will not stop them.

Shall I tell you what one thing can stop them?

Nothing short of overwhelming power will do it . . . overwhelming power in the air, on the land, and on the sea.

We've got the ships and more are on the way. We've got the men, millions of them. And we've got the resources provided by a bountiful Creator.

But we have to have something else to win wars: that something inside a man or a nation that sets off the spark of courage and will to fight for survival.

I know we've got that too. All our history bears witness to the heroic quality of our people. It is a quality that thrives on danger, but languishes on ease and comfort.

It was our luxury and sense of false security that lulled us to sleep. It is the present danger to our existence as a people that must awaken us to throw everything we've got into this war.

Looking back, I can see now that very few of us have any reason to point our fingers at any one else or to boast about what we did before Pearl Harbor. In this connection let me make an admission concerning the Department of Agriculture. I'm afraid we have been going about with a sort of self-righteous attitude. We thought we did something far-seeing when more than a year ago we asked for increased production of hogs. We were rather proud of ourselves when we made plans to furnish food to Britain before the passage of the Lend-Lease Act last spring.

We rose to the heights, we thought, when we established the 1942 farm production goals in September. That was our crowning achievement. The response to the September appeals was wonderful. We sat back in complacency. We took a few opportunities to criticize industry. Oh, yes, we had really done a good job. Why hadn't others done as well?

That was our way of thinking before Pearl Harbor. It has no place in our thoughts today.

Now, I hope we in agriculture are fully awake to the fact that what we have done is not enough.

In 1941 we in agriculture had the job of producing enough for two nations; we anticipated we might have to produce a little extra for a third. Suddenly, almost overnight, we find ourselves in a situation where we may have to supply other nations too. We're pooling our resources—all of the resources that can help win the war—with 25 other nations who are fighting by our sides, shoulder to shoulder, to defend their land and ours, and the freedom that is cherished by all.

Most of us haven't realized as yet how tremendous our task is. We've under-estimated

* An address on January 28, 1942, before a meeting of members of U. S. D. A. War Boards in the Southern States, held in Atlanta, Georgia, and broadcast on the National Farm and Home Hour.

our enemies—and how much will be required to conquer them.

We must, all of us, be prepared in spirit for the sacrifices that lie ahead. There are going to be plenty of them to make. Our old, easy-going way of doing things on the farm, in the factory, in the office or the shop, must go. We've got to toughen ourselves for hardships many of us have never known.

Our sacrifices can prevent other and greater sacrifices. I am thinking of the sacrifice some young man in the armed forces may have to make because you or I failed to do our full part in this vital job of production. There can be no forgiveness if we fail in our duty to our fighting men.

At the present moment, we're unable to supply the United Nations with all the things we would like them to have. Why? Because of lack of shipping. But the ship building program is progressing rapidly—thanks to the foresight of our President. We'll build 8 million tons of shipping this year, and 10 million tons more next year. We'll have a bridge of ships extending across the Atlantic, across the Pacific, to the other American republics. As the bridge grows wider—it will carry more—and more and more of our increased production will be needed.

The total volume of the things that will be needed to strengthen all the united nations for the war effort is so great that it is beyond comprehension. All we can produce with every ounce of our effort and skill will not be too much; all we can give up of the things we now have without weakening ourselves will not be too much. But every bit will help to strengthen our allies.

Farmers Must Start Immediately

It is our job to prepare now to meet the demand, not tomorrow or the next day, but right now. There can be little delay in this business of farming. There is only one time to plant, and if you are not ready at the right time, you have lost a year's production forever. There is no way to make it up.

Consider the task as it has been outlined in the revised production goals for 1942. In order that our supplies of vegetable oils may be adequate, the nation needs two and a half times as many peanuts as were produced in 1941; 50 per cent more soybeans, and a third more flax seed. We need 7 per cent more milk. We need 14 per cent more pigs slaughtered and 13 per cent more eggs produced. We need more land planted to corn and other feed crops.

We need more acres in tomatoes and peas for canning, and more vegetables for fresh consumption; we need more canned and preserved fruit.

The total job of producing is the greatest ever undertaken; it's being undertaken in the face of the fact that labor, supplies and equipment will not be plentiful. We recognize that some of the needs of agriculture must be subordinated to the greater need for armament. I want you to know that the needs of agriculture for labor, equipment, and materials of many kinds have been and will continue to be placed before the officials who have the tremendous responsibility of deciding which needs come first in achieving our total production. After their decisions are made—we can do nothing less than accept those decisions as being best for the national interest. It's up to us to get the job done in spite of all the handicaps that may come in our way. We have got to work harder and longer than ever before in our generation.

Success Assured

Can we meet the demand in spite of the handicaps? Barring unexpected emergencies, we shall have enough food for our own needs. That doesn't mean that there won't be shortages here and there, and some tight squeezes in food supply. But all in all, there will be enough. Why am I confident? Because our farmers have never failed the country and I don't think they ever will. I am confident they'll come through now, provided they are told what they're up against, and provided they get all the help that the public agencies serving agriculture can give them.

During the seasons ahead we can find renewed strength in returning to the self-reliance of our ancestors who cleared a wilderness, made themselves self-sufficient in food and clothing and housing, who shared their labor and their tools. They were rugged, courageous, skillful men and women—those ancestors of ours. They had a vision of a new day as they established and defended their homes. We may have relaxed in some of the virtues which they had—but we must regain them. We must be as tough, as enduring, as hard-working, as skillful as they. We must be, and we will be.

The young manhood of rural areas as well as the cities is being drawn into the Army and the Navy; many of our most skillful and vigorous young men are being taken into wartime industry. This may be a handicap, but we can overcome it if we make the best use of the

manpower that is left. Some of the older men still have a lot of working ability in their muscles, and skill in their minds and hands. Among them are men who were forced to the sidelines by the advance in technology and increasing population on the land. They have been productive workers before—they can be again.

Vegetable Oils Needed

I have spoken of the increased demands upon agriculture. Let me be specific about one type of product. A large percentage of the oils and fats we consume comes from the Far East. With the situation what it is in the Western Pacific, we may be able to bring in very little. Fortunately, we have a good reserve of fats and oils—one that will last us for quite awhile. If we step up our production enough, we may have enough to go round. But the "if" is rather large. Can we increase production enough in this field?

Well, that depends to a large extent on every farmer who can grow peanuts and soybeans. These are our two richest oil-bearing crops.

How much should each farmer increase his acreage of these crops?

The best answer to that question is: As much as he can.

Peanuts and soybeans produce not only large amounts of oil, but also yield a fine, high-protein animal feed. And, incidentally, peanut flour and soybean flour are fine food for human beings.

Under a law enacted by Congress last year, the Secretary of Agriculture is required to support the price of any commodity for which he asks increased production. This support price must be at least 85 per cent of parity. The support price of peanuts will range from 70 to 82 dollars a ton, depending on type, and for soybeans it will average not less than \$1.60 a bushel.

Under existing circumstances, I think everyone will agree that peanuts and soybeans at those prices are profitable crops. The more we have of them, the more successfully we can carry on this war.

But, someone may say, the South cannot compete with the Northwest and Northeast in dairy production; or the Corn Belt in pork production; or the Middle West and West in the production of sheep and cattle. That may be true. But competition is beside the point these days—what we need is production. The South has depended entirely too much on a few cash crops.

Now is the time for the South to get away from its dependence on a few cash crops, and to balance its agriculture. The South needs to produce more food for its own use—not only the production of the individual farm family for home consumption, but more of the meat, fruits, vegetables and other foods which are needed in the South could and should be produced here. You need more of all these foods for your rapidly increasing industrial population, for the army encampments, and for the population in general. The transportation which could be saved by producing more food in this area in itself would be an important contribution to the war effort.

This is the time of all times for diversification and self-sufficiency. This is the time to make live-at-home dreams come true. If the South grows its own food and feed, that much is released for use elsewhere. In the crisis, no contribution is too small.

I hope every Southern farm family grows a garden this year. I want to see Southern smokehouses filled with hams and Southern pantries with fruits and vegetables. This will not only release food for use elsewhere. It will keep our people strong and healthy—and good health is essential to the all out effort to beat Hitler and the Japs.

Perhaps, I have sounded a bit gloomy about this farm picture. In many ways our situation is encouraging. We have on hand the greatest food supplies on record. We have done well. The point I am making is that we must do more. The history of this war is that there is no such thing as too much. The democracies are in their present situation because they have failed to think in big enough terms. I am not afraid of too much. I am afraid of too little. Surpluses of food and feed can be turned into blessings. Too little is a cause for which there is no remedy.

The Price Situation

We farmers are all very much concerned about rapidly rising prices. We have just as much at stake as anyone in the efforts to prevent spiraling prices and resulting inflation. It might seem for the moment that we would gain by higher prices for corn and livestock products. However, I question whether it would be to our advantage in the long run because of the inflationary factors involved and also because of resentment on the part of consumers.

Let me state as simply as I can, my attitude on this price question. I do not want either

(Continued on page 24)

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Principal Articles in This Issue

	PAGE
SOME NEWER IDEAS ON ORCHARD FERTILITY	5
Delivery of Potash Salts During 1941.....	8
WE HAVE WHAT IT TAKES	9
Industry Committee Discusses Current Problems	12
Summary of State Fertilizer Laws.....	14
FERTILIZER MATERIALS MARKET:	
New York	15
Charleston	15
Atlanta	17
Baltimore	17
Chicago	18
Tennessee Phosphate	20

Industry Committee Discusses Current Problems

On January 13th, a meeting was held of the Fertilizer Industry Defense Committee; which was attended by twelve members of the Committee and by eighteen government officials.

During the progress of this meeting it was announced that OPA, OPM, and OADR had named the following to serve as members of a Subcommittee on Nitrogen: George Cushman, Long Island Produce & Fertilizer Co., Riverhead, Long Island; N. E. Harman, Meridian Fertilizer Factory, Hattiesburg, Miss.; Sidney B. Haskell, The Barrett Division, Allied Chemical & Dye Corp., New York; John E. Sanford, Armour Fertilizer Works, Atlanta, Ga.; Oscar F. Smith, Smith-Douglass Co., Norfolk, Va.; and J. A. Woods, Chilean Nitrate Sales Corp., New York.

Nitrate of Soda

It is apparent that the supply of nitrate of soda will not be sufficient to meet this season's agricultural needs, increased requirements for industrial use, particularly for nitric acid and explosives, and the uncertainties as to shipping tonnage for bringing nitrate from Chile being the principal contributing causes.

It is the purpose of OPM, in administering Order M-62, that the distribution of the nitrate available for agriculture shall be made in such way and for such crop uses as will (1) contribute to the national welfare in view of war conditions, and (2) be as equitable as possible among buyers and ultimate users of nitrate.

The Department of Agriculture will cooperate with OPM by advising as to requirements, under its production program, for nitrate, and as to geographical distribution.

OPM hopes it will not be necessary to exercise to the fullest extent the far-reaching control of nitrate distribution for which provision is made in Order M-62. For the present it is looking, instead, to the voluntary cooperation of fertilizer mixers, agents, and dealers in accomplishing its purposes.

Sulphate of Ammonia

A price structure for sulphate of ammonia similar to that for nitrate of soda is contemplated. The aggregate margin for distributors would be \$4.00 for direct shipments from producers to ultimate consumers and \$5.00 when bagged by a fertilizer factory. The margins would not include the cost of bags and transportation.

Superphosphate

The situation with respect to superphosphate and sulphuric acid is not materially different from what it was on December 31st.

Low Analyses and Filler

There was discussion at the committee meeting as to possible savings during the war emergency, with respect to packages, power, transportation, and the like, through the manufacture and use of higher analyses of fertilizers and further elimination of inert materials.

Prices of Mixed Fertilizers

Spring season price schedules are now being examined by OPA officials who commented on some increases in 1942 prices over 1941 prices. Members of the industry committee pointed out the increased cost of bags, labor, and transportation. OPA is watching the situation, and if prices become unjustifiably high control action will probably follow.

JAMES JOINS U. S. D. A. STAFF

Ben James, who for the past three years has been a member of the editorial staff of the National Fertilizer Association, has been appointed principal information specialist in the U. S. Department of Agriculture, effective 16th. He will be directly associated with Roy F. Hendrickson, director of marketing and commodity purchasing activities of the Department. Mr. James has been associate editor of *The Fertilizer Review* and *The N. F. A. News*, published by the Association, and has made a large number of friends throughout the industry who will be pleased to learn of this important appointment.

COVER CROPS REDUCE FERTILITY LOSSES

According to Lindley G. Cook, Extension Soil Conservationist in New Jersey, farmers are losing rich top soil and valuable nutrients through wind and water erosion. Carefully kept records of losses of nitrogen, phosphorus, and potash on tomato plots at the Soil Conservation Research Station in 1939 showed that plots receiving only fertilizer lost these three elements at the rate of \$12.91 worth per acre. Corresponding losses on the plots receiving annual treatments of manure and winter cover crops amounted to only \$0.81 per acre. Thus, losses can be greatly reduced by simple conservation measures.

RISE IN FARM INCOME EXPECTED

Prices received by farmers in 1942 are expected by the U. S. Department of Agriculture to hold around parity, averaging neither greatly above nor greatly below that point. At the end of 1941 prices received were at 99 per cent of parity and the ratio is expected to continue at about that level through this year. Total output of farm products is likely to be the largest on record, in compliance with war-time production goals. In spite of the record supplies, however, prices are expected to rise, due to the greater demand. For the year as a whole, farm product prices are expected to average about 25 per cent above the average for the year 1941. An increase of at least 2 billion dollars in farm income is looked for as compared with 1941, when income amounted to 11.6 billion dollars. Costs of goods and services bought by farmers will rise, which will offset in part the estimated increase in income.

COTTON ACREAGE REDUCED

National cotton acreage goal this year is 25,000,000 acres. This compares with the national acreage allotment under AAA of about 27,400,000 acres. In every one of the four years since the Agricultural Adjustment Act of 1938 was passed, growers have planted a substantially smaller acreage than the national acreage allotment. Last year, with an allotment of 27,400,000 acres, the same as this year, the Department's goal, based on what growers should plant in view of present and prospective supply and demand conditions, was 23,000,000 acres and actual planted acreage was 23,250,000 acres. Total acreage planted was thus in line with the Department's goal.

CHANGE IN S. C. FERTILIZER RULING

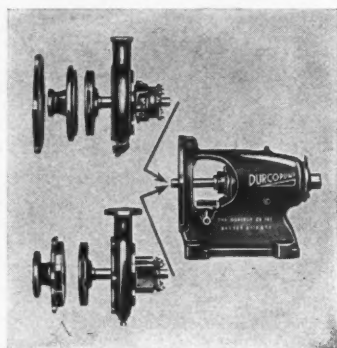
The Fertilizer Board of Control of Clemson College, S. C., has issued the following ruling in connection with the printing of bags: "That Section 10-B of the Laws Governing the Manufacture and Sale of Commercial Fertilizers in South Carolina be changed to read as follows: If shipped in bags, barrels or other containers with a capacity of 50 lb. or more, said information included in items 1-6 inclusive, Section 8, shall be printed directly on the container or a tag or label attached thereto." The announcement also requests that printing on the bags be continued wherever possible, especially the grade numerals. Fertilizer materials in bulk are permitted to be sold for own use and not for resale.

NEW CONVERTIBLE CHEMICAL PUMP

A new series of corrosion-resisting pumps in which it is possible to get 480 combinations of alloys, types and sizes with heads and capacities to meet practically any requirements was displayed at the recent Exposition of Chemical Industries by The Duriron Company, Inc., of Dayton, Ohio.

They have a convertible feature said to be obtainable only in these pumps. "Durcopumps" that are made in the high-silicon irons, Duriron and Durichlor, can be converted to stainless steel pumps simply by substituting only the wet-end parts. The exchange can be made without disturbing the setting of the pump.

This feature is said to be especially valuable where there are frequent changes in processes



or chemicals handled. For instance, a new process may require a different alloy to resist corrosion or to prevent contamination. The required parts are obtainable in the alloy most satisfactory for the purpose and the exchange is easily made. This has an additional advantage during the present emergency when delivery on new equipment is apt to be delayed.

Other features include the interchangeability of newly-designed open and closed impellers

with negative pressure on the stuffing box; oversize ball bearings throughout, and micro-adjustment of the impeller to obtain maximum efficiency.

Bulletin No. 810 illustrates and describes these pumps in detail, with complete dimensions for all sizes. Fertilizer and chemical companies are invited to write for a copy, mentioning this publication for identification.

SUMMARY OF STATE FERTILIZER LAWS

The National Fertilizer Association has issued for the use of its members a chart giving a summary of the fertilizer control laws in the 48 states. The order of stating plant food elements is now uniform throughout the country—N-P-K—with the exception that South Dakota requires phosphoric acid and potash to be stated in terms of the elements P and K instead of P_2O_5 and K_2O . A requirement for minimum plant food exists in 23 states, ranging from 18 per cent in Ohio to 5 per cent in Oregon. A minimum of 16 per cent is set by 13 states and 14 per cent by 6 others.

A tax on tonnage is levied by 30 states, with the smallest fee of \$2.50 per 100 tons in South Dakota and the highest 50 cents per ton in Tennessee and Kentucky. A fee for registering brands is charged by 38 states, ranging from 50 cents per brand in New Jersey to \$50.00 for some brands in Pennsylvania. As a rule, the states levying the higher tonnage tax compensate for this by having a low brand registration fee.

Among other subjects summarized are requirements on statement of nitrogen and phosphoric acid, tolerances allowed, methods of sampling, and penalties for shortages.

BRADLEY & BAKER

FERTILIZER MATERIALS - FEEDSTUFFS

AGENTS - IMPORTERS - BROKERS

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**Clinton St. & Danville Ave.
Baltimore, Md.**

**BRANCHES
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**1252 West Beaver Street
Jacksonville, Fla.**

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

FERTILIZER MATERIALS MARKET

NEW YORK

Ceiling Placed on Organic Feed Materials. Chemical Materials Being Delivered Against Contracts. Sulphur Price Stabilized. Higher Freight Rate Will Affect Costs.

Exclusive Correspondence to "The American Fertilizer."

NEW YORK, January 27, 1942.

Last week the Office of Price Administration placed temporary ceilings on animal products used as feeds and on fish meal, the ceiling being the prices prevailing as of January 17th. This only affects the fertilizer manufacturers indirectly. The ruling as made was not particularly clear and producers are awaiting further advices from Washington which they hope will clear the situation.

Nitrate of Soda

There has been no change in the Nitrate of soda situation, the movement of this material being curtailed by government request, but the demand for the material is heavy.

Sulphate of Ammonia

Sulphate of ammonia continues to move regularly against contract quotas, but all buyers are pressing in an effort to keep their monthly quotas up to date and it is only in an exceptional case where the producers have delivered in accordance with contract conditions. In most cases, deliveries are considerably behind schedule.

Potash

Potash deliveries are being made against contract commitments and are fairly well up to date, but very little, if any, new business is being accepted.

Sulphur

It was announced from Washington that the Freeport Sulphur Co. pledged that their price for sulphur, f.o.b. mines, would not be increased during 1942. However, with the further withdrawal of coastwise boats, more and more sulphur will have to move by rail, which is bound to reflect in increased cost of sulphuric acid.

Superphosphate

Phosphate rock will also move in larger quantities by rail so the additional cost will surely be reflected in time in the cost of superphosphate.

Triple superphosphate continues in demand with no nearby material available except against contracts already made. It is possible that after the middle of the year the material may not be as tight but, from all indications, producers will be hard pressed throughout the year to take care of the demand.

CHARLESTON

Active Inquiry on Organic Materials with Supplies Scarce. Almost No Offerings of Superphosphate.

Exclusive Correspondence to "The American Fertilizer."

CHARLESTON, January 27, 1942.

Nitrogenous.—Inquiries on this have been quite active recently and supplies are scarce. The market is around \$3.00 per unit of ammonia (\$3.64½ per unit N) f.o.b. western points for January/February. Sellers are not quoting for March forward.

Blood.—Is quoted around \$5.00 per unit of ammonia (\$6.08 per unit N), f.o.b. ports, for imported material. This material is very scarce. In the Chicago market the quotations are \$5.25 to \$5.40 per unit of ammonia (\$6.38 to \$6.56½ per unit N).

Fish Meal.—Is selling around \$72.00 per ton, f.o.b. Baltimore.

Cottonseed Meal.—The 8 per cent grade is quoted at \$43.00 to \$44.00, Augusta; \$40.00, Memphis. The 7 per cent material is priced at \$40.00 to \$41.00 in Augusta.

Superphosphate.—This remains scarce, with practically no offerings.

Bone Meal.—Very little is being offered, especially imported. 4½ and 50 per cent around \$37.50, Philadelphia.

Food for FREEDOM Food for VICTORY

The Food for Victory campaign organized by the U. S. Department of Agriculture is vital to victory against the common enemy. Success at the front depends upon all-out effort on the farm and in the factory. To that success and to ultimate victory, our entire advertising effort is dedicated.

NATURAL CHILEAN

NITRATE OF SODA

NOTE: This advertisement appears in Farm Papers in February.

Southern Agriculturist

Food for Freedom . . .
Food for Victory . . .
Former-r-r-d, March!



The American farmer shouts, "Come on, let's go!"

More milk, more pork, more eggs and poultry; more fruits, vegetables and vegetable oils . . . These are foods America needs—and looks our allies need. These foods from American farms will help to win the war on every front.

In every state of these United States farmers are now enlisted in the greatest food production program the world has ever known—the Food for Freedom program organized by the United States Department of Agriculture.

Your nation's call for food has brought an overwhelming response. Your products to meet your food production goal, put you literally on the fighting front. Now food will flow from your farm—from every farm—so that every American fighting man, every American war worker and civilian, can have the strength-building foods that victory requires.

Beyond our own huge war-time needs, we are pledged to deliver to Great Britain vast quantities of milk, pork, eggs, poultry, fruit, vegetables and vegetable oils. These are foods

her people need as they can fight and tank shoulder to shoulder with us.

Food for Freedom . . . Food for Victory!

Now is the time to get your farm ready. Careful plans must be made and made NOW. This is almost your last opportunity to get your implements in shape. This is the sure hour for getting all set to produce the foods that will help us and our allies smash through to victory and peace. Food is a big gun in this war. Food will win it.

It will break the enemy down. Foods which you produce on your farm are just as vital as planes, ships, tanks.

Your own farm goal is a vital link in a great chain of effort. No chain is stronger than its weakest link. That's why what you do, on your farm, is so overwhelmingly important.



THE AMERICAN FERTILIZER

Collards

Formerly it was the practice to plant collards in summer to have them ready for use after frost in the fall. They were grown loose about the house. The prevailing idea was to grow large loose heads. Now the moving of collard heads to give a succession of new begins in early spring and continues to give a succession of harvests. Instead of growing large heads of collards, they are now grown thickly and sold in bunches. In most Southern cities there is a demand for young collards all through the growing season—17 p. 2.

This is one of a series of reports from the United States Department of Agriculture published by the Chilean Nitrate Educational Bureau, Inc., in furtherance of the Nation's war-time defense program. Publication of this report in this space does not constitute endorsement by the United States Department of Agriculture of any commercial product.

ATLANTA

Rationing Program and Price Ceilings Will Affect Fertilizer Business. Vegetable Meals and Nitrogenous a Possible Solution.

Exclusive Correspondence to "The American Fertilizer."

ATLANTA January 26, 1942.

It is becoming increasingly apparent that OPA will gradually attempt to regulate commodity prices in general. Ceilings on quite a number have already been established. It is also becoming apparent that O. P. M. will institute a rationing program on many key commodities, so between the two, the fertilizer industry seems to be in for a hectic season for the duration.

With both nitrate of soda and sulphate of ammonia being in the above category, it would seem logical that buyers should interest themselves in such organic nitrates as are still available and are not regulated as yet. This includes certain vegetable meals, nitrogenous tankage and the like. Insofar as blood and tankage are concerned, most of these products are now going to feed.

The general markets are as follows:

South American Blood.—\$5.00 (\$6.08 per unit N), c.i.f. the ports.

Imported Tankage.—\$5.25 (\$6.38 per unit N) and 10 cents c.i.f. the ports.

Domestic Nitrogenous.—\$3.00 (\$3.64½ per unit N), western producing points.

Menhaden Unground Scrap. — Nothing offered.

Acidulated Fish.—Producers sold out.

Sulphate of Ammonia.—Some activity in the resale market but stocks limited.

Nitrate of Soda.—Being allocated by the Government on the basis of previous takings.

Cottonseed Meal.—Prime 8 per cent, \$41.00, Memphis; southeastern mills, \$43.00.

BALTIMORE

Ceiling on Organic Feed Materials Has Little Effect on Fertilizer Market. Burlap Situation Still Critical.

Exclusive Correspondence to "The American Fertilizer."

BALTIMORE, January 27, 1942.

There have been no outstanding features in the market on fertilizer materials during the past two weeks. During the interim the OPA has placed temporary ceiling on animal products used as feed and on fish meal, but this will have little effect on the market for fertilizer materials.

Ammoniates.—Due to rapidly increasing market on animal products for feed, representing an advance of about 20 per cent since December 8th, the temporary ceiling is based on prices prevailing January 17th as maximum. In sympathy with the market prevailing on feeding materials, the market on wet rendered tankage advanced almost a dollar per unit of nitrogen, and as it was reported that holders were asking as high as \$6.60 per unit of nitrogen and 10 cents per unit of B.P.L., f.o.b. producing points, this price, of course takes it out of the class of fertilizer material. Ground dried blood, on the other hand, advanced to about \$6.20 per unit of nitrogen but without any interest being shown.

Nitrogenous Material.—The market is dormant and the nominal price is about \$4.00 per unit of nitrogen, f.o.b. Baltimore.

Sulphate of Ammonia.—There are a number of inquiries on the market for domestic consumption, but without any re-sale material offering, as it now appears that fertilizer manufacturers in general will not have sufficient tonnage to see them through the coming spring season.

Nitrate of Soda.—It is reported that the distribution of this product will be on allocation basis, but without definite information as to

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

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what tonnage will be available to fertilizer manufacturers this season as compared with last season. It is a foregone conclusion, however, that it will be impossible for fertilizer manufacturers to increase their requirements beyond last year's tonnage, and this will probably make for a shortage of mineral ammoniates during the spring season. The nominal market on the Chilean product is unchanged at \$30.00 per ton of 2,000 lb., in bulk; \$33.00 in 100-lb. bags; and \$32.40 in 200-lb. bags, ex port warehouses.

Fish Meal.—Temporary maximum ceiling price by processors is fixed by OPA to the prices that were prevailing on January 17, 1942, with maximum for fish meal which makes the price of 60 per cent material \$72.50 per ton, f.o.b. Baltimore, packed in new, 100-lb. bags, and represents an advance of approximately 25 per cent during the past two months.

Superphosphate.—There is nothing new to report in the market on this material, which is still being quoted on the basis of 60 cents per unit for run-of-pile, basis 16 per cent, with flat 16 per cent grade being offered at \$10.10 per ton of 2,000 lb., both in bulk, f.o.b. Baltimore. There are no heavy stocks accumulating, due to good demand for sulphuric acid for National Defense purposes.

Bone Meal.—Both raw and steamed bone meal are covered by OPA order No. 74 under the classification of animal product feed stuffs. The last nominal quotations on 3 and 50 per cent steamed bone meal ranged from \$37.00 to \$38.00 while 4½ and 47 per cent raw bone meal was quoted at \$37.50 to \$38.00, f.o.b. Baltimore.

Potash.—It would appear that all manufacturers are conserving their supplies, as there have been no recent resale offerings on the market. There is still hope by fertilizer manufacturers that domestic producers will be able

to supply legitimate domestic requirements. In the meantime, the market is nominal and no business is being booked, but deliveries are being made against outstanding contracts.

Bags.—The burlap situation is still critical and it now develops that instead of fertilizer manufacturers being able to count on securing one-third of the quantity of heavy weight burlap bags they obtained last year, it will probably be necessary for them to take 40 per cent of this one-third in bags of light-weight construction of 7½ oz. and 8 oz. burlap. Most of the manufacturers feel that the lighter-weight burlap is not suitable to carry fertilizer and the added cost of liners would put light-weight burlap bags entirely out of running. Bags of all descriptions are in short supply and many of the manufacturers will doubtless be compelled this year to use second-hand bags, as it is doubtful whether it will be possible to secure sufficient new burlap or paper bags to take care of their spring requirements.

CHICAGO

Fertilizer Organic Market Steady. Fill-in Business Expected Soon. Feed Market Unsettled.

Exclusive Correspondence to "The American Fertilizer."

CHICAGO, January 26, 1942.

A continued steady market is ruling in organics, and rumors are heard of sales at sellers' asking prices. No signs, however, of persistent buying can be noted, but fill-in business should soon become manifest. Nitrogenous is about the only organic offered now on the western market.

In the feed market, conditions are more or less unsettled, following the ceilings placed on the finished goods.

Nominal prices are as follows: High grade ground fertilizer tankage, \$4.00 to \$4.10 (\$4.86 to \$4.98½ per unit N) and 10 cents;

BACK TO THE LAND

Extracted from deposits beneath the Gulf Coast
at Port Sulphur, La., and Freeport, Tex., sulphur
—better than 99½% pure—goes back to the
land in fertilizer to help solve soil problems.

FREEPORT SULPHUR COMPANY

122 East 42nd Street, New York City

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WE'RE DOING OUR BEST... TO HELP AGRICULTURE DO ITS BEST

Fruitful harvests? They're a "must" today as never before! Ample food supplies are the very basis of the nation's effort. And to help soils throughout the country do their best job, American agriculture is making the heaviest demands upon the domestic potash industry in its history. As an important factor in this industry, we recognize our responsibility to see that agriculture shall not want for quality potash. Today management, personnel and equipment of the United States Potash Company are working together as a close-knit unit to assure adequate supplies of this major plant food in the days ahead.

UNITED STATES POTASH COMPANY

Incorporated

30 Rockefeller Plaza, New York

REG. U. S. PAT. OFF.



HIGRADE MURIATE OF POTASH

62/63% K_2O

Also 50% K_2O Grade

MANURE SALTS

22% K_2O Minimum

MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

standard grades crushed feeding tankage, \$5.50 to \$5.60 (\$6.68½ to \$6.80½ per unit N) and 10 cents; blood, \$5.40 to \$5.45 (\$6.56½ to \$6.62½ per unit N); dry rendered tankage, \$1.20 to \$1.25 per unit of protein, Chicago, basis.

TENNESSEE PHOSPHATE

Rush of Orders for Ground Rock for Direct Application. Armour Acquires New Deposits. Monsanto Awarded Navy "E" Pennant.

Exclusive Correspondence to "The American Fertilizer."

COLUMBIA, TENN., January 26, 1942.

Producers of ground phosphate rock for direct application, who generally have very little business in December, January and February and use those periods to accumulate stock ahead for the customary peak periods of March and April, have been working day and night under a flood of December orders for prompt shipment. This will doubtless exhaust the entire productive capacity for the first five months of 1942, with no leeway allowed for accumulating anything except angry inquiries as to why shipment can not be made at once. In addition to the orders from regular customers, the AAA has ordered 20,000 tons for Illinois, and while the invitation for bids estimated no consumption in January, the full amount of 2,000 tons for that month has been added to the above requirements.

Additional activity in the phosphate area north of Columbia is indicated by the reports of purchase of lands, phosphate rights and rights of way in the region west of Cleburn and Springhill by the Armour Fertilizer Works. From here it is said the matrix material will be transported to the Armour plant in the Century region, where they now handle material not only from adjacent mines, but also from mines at Mt. Pleasant, Ashwood and the Peerless mines south of Columbia.

To take care of the heavily increasing ground rock business of the Ruhm Phosphate & Chemical Co., the Hoover and Mason Phosphate Co. at Mt. Pleasant is installing a 50 per cent increase in the grinding and bagging plant, after having just completed installation of the new washing plant. The drying plant, having long been of greater capacity than either washing or grinding, does not as yet need increase.

A good year in phosphate mining circles is indicated unless the bugbear of priorities continues to prevent some of the necessary activities. It is hoped that full realization of the absolute necessity for phosphate in many defense activities in chemical warfare lines, will be extended in full measure to its far more important need for food in defense.

On January 22nd, Admiral W. T. Cluverius, U. S. N., presented to the officials and operating force of the Monsanto Chemical Co. phosphorus plant near Columbia the Navy "E" pennant and Navy Ordnance flag for the exceptionally successful efforts in maintaining production of this vital defense material at high levels. A. T. Beanregard, manager of the plant, and the entire personnel of the company are now entitled to wear the "E" button as a token of their country's appreciation.

N. C. AIDS IN USE OF SECOND-HAND BAGS

The North Carolina Department of Agriculture has recently addressed a letter "To All Fertilizer Manufacturers," in which it is stated: "We will, for the time being, due to war conditions, forego the enforcement of that provision of the fertilizer act which requires the brand name and grade to appear on the bag. This is done in order that you may use second-hand bags and make your guaranteed analyses on a tag. The analysis and inspection tags should be attached at the end of the bag between the 'ears.'"



BEMIS WATERPROOF BAGS
 Keep Moisture Out
 Keep Quality In
 Keep Costs Down
 SEND FOR SAMPLE
 AND FULL DETAILS.
BEMIS BRO. BAG CO. ST. LOUIS
 BROOKLYN

We Are Ready to Do
 Our Part.
 How May We Help YOU?

THE DICKERSON COMPANY
 Incorporated
 Drexel Building, Philadelphia, Pa.
 — Brokers —
FERTILIZER MATERIALS

FERTILIZER MATERIALS

LET US QUOTE
YOU ON YOUR
REQUIREMENTS
OF THESE
MATERIALS

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PHOSPHATE ROCK
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SUPERPHOSPHATE
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DOUBLE
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NITRATE of SODA
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SOME NEWER IDEAS ON ORCHARD FERTILITY

(Continued from page 7)

crops are seeded in early June, as has been practiced since 1929, the difference may not be marked."

Most orchard owners are interested to learn that it took 16 years of clean cultivation and late summer seeding of non-legume covers to so deplete this Hagerstown clay-loam soil of organic material and exhaust the nutrients to points low enough to even show in tree growth and yield. Cover growth began to show the need of food in the fifth to seventh year.

In the case of the legume covers, nitrogen was being returned to the soil by the legume plants. This resulted in better covers each year. The trees with legume covers showed no need of food after 22 years of growth. As orchards grow older, the need of complete fertilizers for both the trees and cover crops will become more marked.

Referring to your Professor Hofmann's report on fertilizers for orchard soil fibre in the Virginia State Horticultural Society report for 1939, we find that his studies show much more growth of cover material resulting from the use of phosphate and potash when used along with nitrogen, than when nitrogen was used alone.

Let me here and now make a plea for the use of complete food for our orchards, for the use of phosphate, the use of potash, the use of calcium (lime); for the right use of cover crops, yes, for the use of legume cover crops. If an orchard man gets his land into a condition good enough to grow legumes (clovers of all kinds, including Ladino clover, alfalfa, lespedeza, vetch, etc.) and really grows them in the orchard, he will never need to worry about his soil fertility. So far I have yet to find the farmer who has harmed his land or his farm income by the growing of clovers.

The word of praise to the chemical fertilizer, and lime industries that I wish to stress is this, they have in the last 15 years worked hard and are able to give a usable complete orchard fertilizer containing as high as 16 per cent nitrogen, 10 per cent phosphate, 8 or 10 per cent potash, along with calcium (with even some of the so-called rare elements, boron, zinc, manganese, copper, iron, magnesium, etc., thrown in).

I have here a jar of a complete orchard fertilizer made in November, 1940. It has been in an open bag in a dry wareroom ever since, and it is now usable. It is 16 per cent nitrogen, 10 per cent phosphate, 8 per cent potash (could have been a 10 per cent potash without any trouble). The 16 per cent nitrogen is the same amount of nitrogen you would apply to your orchard when applying nitrate of soda. The nitrogen in this complete fertilizer comes from nitrate of soda, uramon, ammo-phos, cyanamid, and sulphate of ammonia, a nitrogen supply that would not be available to the tree all at the same time but would extend over a longer period of time in the spring than it would if all the nitrogen were from one source like nitrate of soda, sulphate of ammonia, etc. Besides the nitrogen sources there is room in the mixture for enough sulphate and muriate of potash to give 8 per cent and could be 10 per cent potash plus the 10 per cent phosphate. Now besides these 3 important elements of food, there is still room in the mixture for 300 pounds of limestone rock flour, 100 pounds of raw phosphate flour (a good dryer in itself), and 10 pounds of dryer like cocoa shell meal or tobacco stem dust, a mixture with room for the rare elements if wanted.

Yes, I say a word of praise is due the chemical fertilizer industry for making such fertilizer available to the American farmer and fruit grower. A 16-10-8 or a 10-6-4 complete



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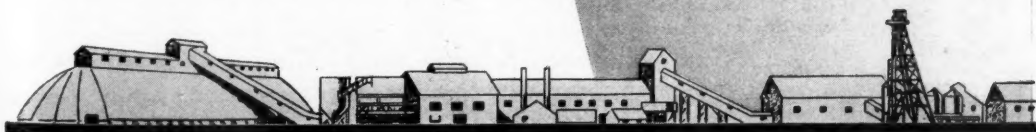
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SULPHATE OF POTASH-MAGNESIA
40% K_2SO_4 , 18.50% MgO



fertilizer could be made that I would not want to use. Let us say one in which all the nitrogen came from one source that was very soluble or fast acting or one made from a nitrogen source that would be slow and long drawn out in its availability. In either case, such a mixture would not be the one I would like to feed my trees.

You will say this complete fertilizer sounds all right but it costs too much money. The price of such a complete fertilizer may sound high, but the fertilizer manufacturer will be making such mixtures as 16-10-8, 16-10-10, 10-6-4, and 10-10-10 and selling them to you growers at the same price per unit of plant food as if you bought your own sources of nitrogen, phosphate, and potash. To be sure, the manufacturer will have to charge for the mixing of a ton of 16-10-10 or 10-6-4. The mixing cost, however, will be no greater than if he mixed a ton of 2-8-4. In 100 pounds of 16-10-10 you get 36 pounds of plant food. In 100 pounds of nitrate of soda you get 16 pounds of plant food. In 100 pounds of superphosphate you get 16 or 20 pounds of plant food, depending on whether you buy 16 or 20 per cent goods. In 100 pounds of sulphate or muriate of potash you get 49 to 60 pounds of plant food. In any mixed complete fertilizer you pay the fertilizer company on the base price of the nitrogen units, the phosphate units, and the potash units. Figure it out for yourself and you'll see that you pay only for the pounds of plant food you get regardless of nitrogen source, phosphate source, or potash source. If we can get to using a good complete fertilizer in early spring soon after the frost is out of the soil, our cover crops will grow better, our grass or legume sods will grow better, and in a few years our tree growth and yields will be better.

I wish to thank you, Orchardist Harry F. Byrd, for the honor you have bestowed upon the orchard work of the Pennsylvania State College when you invited me to speak on the important subject of orchard fertility. I thank your guests for their kind attention, and I trust some good to you all will come from this discussion.

WE HAVE WHAT IT TAKES

(Continued from page 11)

farmers, or consumers, to misunderstand my position. I want farmers to have parity. I am directed by law to obtain insofar as I am able, parity for agriculture. Furthermore, I think time has proved that parity—in most instances—means what it is supposed to mean—a fair return to farmers and a fair cost to consumers.

Therefore, I am going to strive for parity, and once the goal is reached—as we have nearly reached it now—I am going to do everything in my power to keep parity.

But, let us be satisfied with parity. When farm prices go much above parity, danger is ahead. Farm prices that are too high now will mean farm prices that are too low later on. If we take advantage of the situation to profiteer, an angry public will rebel. Good will is one of the most precious commodities that farmers have to sell. Let us see that we produce enough of that too.

If prices rise substantially above parity, we also are in for trouble. We will have to accept ceilings and rationing. I am in favor of price ceilings when they are needed, and I think they are needed now on many farm com-

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See Page 4

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modities. Handled in the right way, price controls for both agricultural and industrial products are a good thing for all concerned.

But I have repeated over and over something that seems simple to me: farmers cannot produce abundantly without fair prices. That is why we are assuring price support for a good many farm products.

The price incentive is a powerful one when an increase in a particular commodity is desired. Peanuts are an example. We want more peanuts. To get them, we must pay enough to enable farmers to shift from cotton, tobacco and other crops to peanuts. Otherwise, farmers may want to grow peanuts, but they simply can't afford to grow more.

Now back to price policy. I am going to do all I can to keep prices up to parity. I am going to do all that I can to keep them from going much beyond parity. I think such a policy is in the best interests of both farmers and consumers. I feel that the vast majority of the farmers and consumers feel so too.

But, let me emphasize, production is our best reliance to make that policy work. Nothing will substitute for it. Under certain circumstances, food can be cheap at any price. In some cases, we may have to pay well above parity to get enough of certain foods produced. If so, we cannot hesitate. We must pay the price necessary to get the commodities we need. That may be the only way to prevent calamities far worse than temporarily high prices.

Because of the abundant production of two record crop and livestock years in a row, and the prospects of a third record year coming up, it now seems that farm prices will average around parity for 1942. That is the judgment of the Department's economists, expressed in the current price situation report. Of course these men could not foresee any more than you and I can foresee the size of the demand for farm products that may come on us if the shipping is available to take our allies all the food we would like to send them. The demand may expand so greatly that it will force prices up; but as of the present, these experts say prices will stay around the level that the Congress has established as fair to both farmers

and consumers—parity. That forecast is evidence of the great power of adequate production to prevent inflation, and all the evils that follow after inflation.

It seems safe to predict that farmers will have a greater income in 1942 than they have had for years. Farm income last year was over 11 billion dollars, and it is expected to advance to perhaps 13 billion in 1942. The average farm family will have more money to spend; so will most other families but there will be fewer things to spend it for, as the nation takes off the fat—and dispenses with luxury goods of all kinds, in order to devote a larger and larger proportion of our productive capacity to winning the war. If this extra money is concentrated on the smaller volume of goods which can be purchased, there will be an increasing tendency toward inflation, and resistance against price ceilings. That is exactly what the nation needs to avoid. The money should be used for the things that will do most to help the individual family over the long pull—and do most to help our country. The individual farmer should seize upon this opportunity to reduce his debt load—or better still to get entirely out of debt.

There is another use to which this additional spending power should be put: That is, buying Defense Savings Bonds. I cannot emphasize this too strongly—for nothing that we can do with our money offers such great return. The return is not in money alone—although the interest rate is attractive. But money invested in Defense Savings Bonds has a positive action in preventing inflation, and of supreme importance—it helps to finance the huge undertaking of winning the war.

We are not fighting this war as farmers, or factory and office workers, or businessmen.

We are fighting as one united people. We are fighting for our life as a nation. And all of us will fight with the passion that springs from our love of freedom.

We are going to fight through to a new world. And, on the ashes of the old, we are going to build a better one.

God give us the courage, the wisdom, and the staying power to do it.

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This list contains representative concerns in the Commercial Fertilizer Industry, including fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc.
For Alphabetical List of Advertisers, see page 33.



ACID BRICK

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS

Chemical Construction Corp., New York City.

ACIDULATING UNITS

Chemical Construction Corp., New York City.
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AMMO-PHOS

American Cyanamid Co., New York City.

AMMONIA—Anhydrous

Barrett Division, Allied Chemical & Dye Corp., New York City
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR

Barrett Division, Allied Chemical & Dye Corp., New York City
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Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS

Chemical Construction Corp., New York City.

AMMONIATING EQUIPMENT

Sackett & Sons Co., The A. J., Baltimore, Md.

AMMONIUM NITRATE SOLUTIONS

Barrett Division, Allied Chemical & Dye Corp., New York City

AUTOMATIC ELEVATOR TAKEUPS

Sackett & Sons Co., The A. J., Baltimore, Md.

BABBITT

Sackett & Sons Co., The A. J., Baltimore, Md.

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Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Cotton

Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Paper

Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.

BAGS (Waterproof)—Manufacturers

Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Dealers and Brokers

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Baker & Bro., H. J., New York City.
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Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Taylor, Henry L., Wilmington, N. C.
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Bagpak, Inc., New York City.
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McIver & Son, Alex. M., Charleston, S. C.
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BUYERS' GUIDE

For an Alphabetical List of all the
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BUCKETS—For Hoists, Cranes, etc., Clam Shell, Orange Peel, Drag line, Special; Electrically Operated and Multi Power

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Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur

Chemical Construction Corp., New York City.

BURNERS—Oil

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Huber & Company, New York City.

CHEMICALS—Continued

International Minerals & Chemical Corporation, Chicago, Ill.

McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
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Fairlie, Andrew M., Atlanta, Ga.

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Dickerson Co., The, Philadelphia, Pa.
Phosphate Mining Co., The, New York City.

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Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

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Taylor, Henry L., Wilmington, N. C.
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DRYERS—Direct Heat

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DRIVES—Electric

Link-Belt Company, Philadelphia, Chicago.

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Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS

Sackett & Sons Co., The A. J., Baltimore, Md.

ELECTRIC MOTORS AND APPLIANCES

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS

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Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS

American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Co., Columbus, Ohio
International Minerals & Chemical Corporation,
Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE

Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE

American Agricultural Chemical Co., New York City.

GUANO

Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable

Hayward Company, The, New York City.

HOPPERS

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE

Tennessee Corporation, Atlanta, Ga.

INSECTICIDES

American Agricultural Chemical Co., New York City.

LACING—Belt

Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE

American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling

Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying

Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Grinding and Pulverizing

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

A Classified Index to Advertisers in
"The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the
Advertisers, see page 33

MACHINERY—Power Transmission

Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Pumping

Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MAGNETS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MANGANESE SULPHATE

McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corporation, Atlanta, Ga.

MIXERS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, Allied Chemical & Dye Corp., New York City
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS

Chemical Construction Corp., New York City.

NITROGEN SOLUTIONS

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

PANS AND POTS

Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS

Chemical Construction Corp., New York City.

PHOSPHATE ROCK

American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Charleston Mining Co., Inc., Richmond, Va.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmaltz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting

Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware

Chemical Construction Corp., New York City.

PIPES—Wooden

Stedman's Foundry and Mach. Works, Aurora, Ind.

PLANT CONSTRUCTION—Fertilizer and Acid

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.

Taylor, Henry L., Wilmington, Del.

Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers

American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
Union Potash & Chemical Co., Chicago, Ill.
United States Potash Co., New York City.

PULLEYS AND HANGERS

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Wellmann, William E., Baltimore, Md.

QUARTZ

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower

Chemical Construction Corp., New York City.

ROUGH AMMONIATES

Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

A Classified Index to Advertisers in
"The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the
Advertisers, see page 33

SCALES—Including Automatic Bagging

Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCRAPERS—Drag

Hayward Company, The, New York City.

SCREENS

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SEPARATORS—Air

Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Including Vibrating

Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Magnetic

Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHAFTING

Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHOVELS—Power

Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corp., Chicago, Ill., and Cedar
Rapids, Iowa.
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers

Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS

Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, Allied Chemical & Dye Corp., New
York City
Bradley & Baker, New York City.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

SULPHUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Freeport Sulphur Co., New York City.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation,
Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Taylor, Henry L., Wilmington, N. C.

SULPHURIC ACID—Continued

U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE

American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation,
Chicago, Ill.

Jett, Joseph C., Norfolk, Va.

McIver & Son, Alex. M., Charleston, S. C.

Schmaltz, Jos. H., Chicago, Ill.

Taylor, Henry L., Wilmington, N. C.

U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation,
Chicago, Ill.

Phosphate Mining Co., The, New York City.

U. S. Phosphoric Products Division, Tennessee Corp.,
Tampa, Fla.

SYPHONS—For Acid

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TALLOW AND GREASE

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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
International Minerals & Chemical Corporation,
Chicago, Ill.

Jett, Joseph C., Norfolk, Va.

McIver & Son, Alex. M., Charleston, S. C.

Schmaltz, Jos. H., Chicago, Ill.

Smith-Rowland, Norfolk, Va.

Taylor, Henry L., Wilmington, N. C.

Wellmann, William E., Baltimore, Md.

TANKAGE—Garbage

Huber & Company, New York City.

TANKS

Sackett & Sons Co., The A. J., Baltimore, Md.

TILE—Acid-Proof

Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption

Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat

Hayward Company, The, New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA

DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR

DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting

Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Durrion Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

WHEELBARROW (See Carts)

ZINC SULPHATE

Tennessee Corporation, Atlanta, Ga.

ALPHABETICAL LIST OF ADVERTISERS

For Classified Index, see pages 28 to 32, inclusive

- American Agricultural Chemical Co., New York City 3
 American Cyanamid Co., New York City...—
 American Limestone Co., Knoxville, Tenn. 22
 American Potash and Chemical Corp., New York City 4, 25
 Armour Fertilizer Works, Atlanta, Ga. ... 21
 Ashcraft-Wilkinson Co., Atlanta, Ga.,
 Front cover
 Atlanta Utility Works, East Point, Ga.—
 Bagpak, Inc., New York City—
 Baker & Bro., H. J., New York City,
 Back cover
 Barrett Company, The, New York City—
 Bemis Bro. Bag Co., St. Louis, Mo. 20
 Bradley & Baker, New York City 14
 Charleston Mining Co., Inc., Richmond, Va. 4
 Charlotte Chemical Lab., Charlotte, N. C. ...—
 Chemical Construction Corp., New York City 25
 Chilean Nitrate Education Bureau, New York City 16
 Dickerson Co., The, Philadelphia, Pa. 20
 Dougherty, Jr., E., Philadelphia, Pa. 33
 Du Pont de Nemours & Co., E. I., Wilming-
 ton, Del.—
 Duriron Co., The, Dayton, Ohio—
 Fairlie, Andrew M., Atlanta, Ga. 29
 Farmers Fertilizer Co., Columbus, Ohio ... 34
 Freeport Sulphur Co., New York City ... 18
 Gascoyne & Co., Inc., Baltimore, Md. 34
 Hayward Company, The, New York City ... 34
 Huber Co., L. W., New York City 26
 Hydrocarbon Products Co., New York City 17
 International Minerals Chemical Corp., Chi-
 cago, Ill.—
 Jeffrey Mfg. Co., The, Columbus, Ohio....—
 Jett, Joseph C., Norfolk, Va. 34
 Keim, Samuel D., Philadelphia, Pa. 33
 Link-Belt Company, Chicago, Ill.—
 McIver & Son, Alex. M., Charleston, S. C. 27
 McLaughlin Gormley King Co., Minne-
 apolis, Minn.—
 Monarch Mfg. Works, Inc., Philadelphia,
 Pa. 34
 Pacific Coast Borax Co., New York City,
 2d cover
 Phosphate Mining Co., The, New York City —
 Polk Co., R. L., Detroit, Mich.—
 Potash Co. of America, New York City,
 3d cover
 Ruhm, H. D., Columbia, Tenn. 34
 Sackett & Sons Co., The, A. J., Baltimore,
 Md.—
 Schmaltz, Jos. H., Chicago, Ill. 34
 Shuey & Company, Inc., Savannah, Ga. 34
 Smith-Rowland Co., Norfolk, Va.—
 Southern Phosphate Corp., Baltimore, Md. —
 Stedman's Foundry and Machine Works,
 Aurora, Ind. 24
 Stillwell & Gladding, New York City—
 Synthetic Nitrogen Products Co., New York
 City—
 Taylor, Henry L., Wilmington, N. C. 28
 Tennessee Corporation, Atlanta, Ga.—
 Texas Gulf Sulphur Co., New York City...—
 Union Potash & Chemical Co., Chicago, Ill. 23
 U. S. Phosphoric Products Division,
 Tennessee Corp., Tampa, Fla. 25
 United States Potash Co., New York City .. 19
 Wellmann, William E., Baltimore, Md. ... 27
 Wiley & Company, Inc., Baltimore, Md. ... 34

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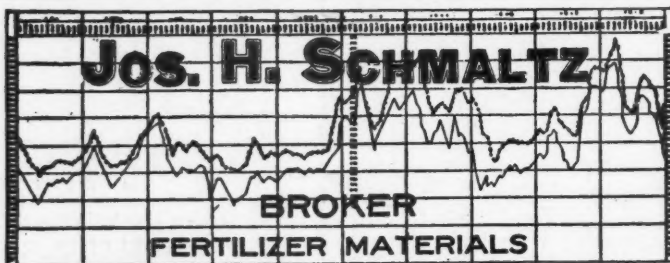
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